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Continuous CTOAs in a cuing task bring about Inhibition of Return, but not early facilitation

Exogenous orienting typically shows a biphasic facilitation-inhibition pattern in experiments with the traditional Posner cueing paradigm. Nevertheless, no early facilitation was found under condition with a random cue-target onset asynchrony (CTOA) chosen within a range of –300 <> +1000ms (MacInnes & Krüger, 2015; MacInnes, in press). This finding might be due to the specifics of the design resulting in the less likelihood of targets happening at short CTOAs (0 .. 250ms) than at longer CTOAs. Here we present the results of the replication with multiple sessions per participant and with the CTOA gamma-distributed to weight the likelihood that the range would fall within the range typical of early facilitation.

- **Prediction 1**. Manual reaction time (MRT) responses will be speeded following a valid pre-cue at short CTOAs due to the gamma distribution of CTOAs.
- **Prediction 2**. MRT responses will be slowed following a valid pre-cue at longer CTOAs showing a typical Inhibition of Return (IOR).

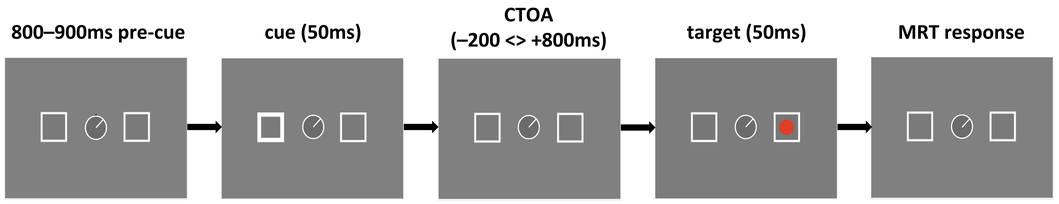

Figure 1. A structure of a trial (pre-cue invalid condition). Proportions are not preserved.

- Exogenous, non-informative cues
- 2 cue & target locations (valid vs invalid)
- Pre-cue condition: cue prior to target
- Post-cue condition: cue after target
- Gamma distribution (α = 4.3 & β = 0.8): 20% post-cue trials, 50% trials between 0 and 210ms, 30% trials with longer CTOAs
- Random CTOAs (–200 <> +800)
- Catch trials (no target) included
- MRT – speeded button response
- 5 sessions during 2 days, 880 trials per participant in total
- N = 3, female, mean age = 26.3

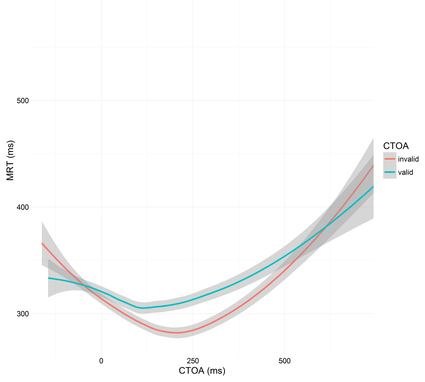

Figure 2. MRT results show clear IOR but no early facilitation. There are main effects of CTOA ($\chi^2(1) = 44.5$, $p < .001$), validity ($\chi^2(1) = 6.7$, $p = .009$) and validity by CTOA interaction ($\chi^2(1) = 6.7$, $p = .01$). Valid trials are on average 9.8ms slower than invalid trials (sd 2.8). MRTs are faster at later CTOAs (.002/ms, sd .001).

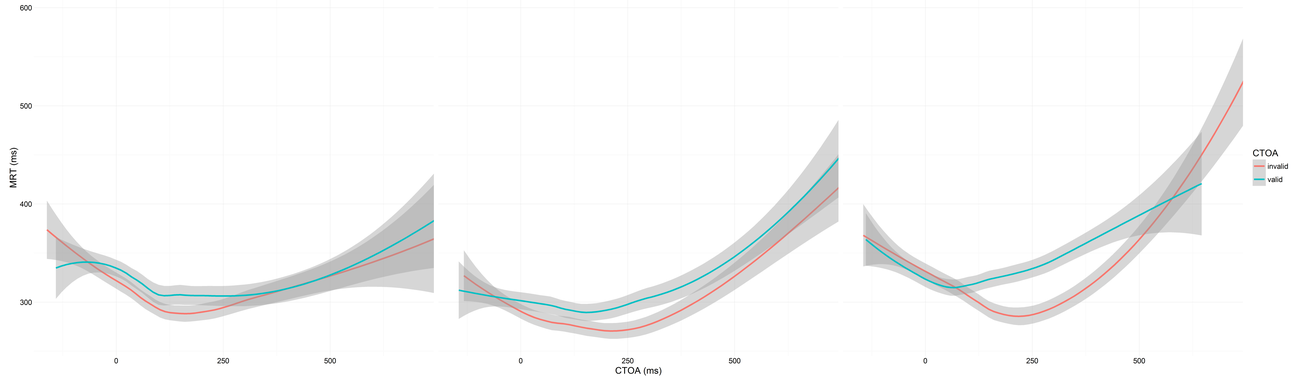

Figure 3. Individual participants are consistent in showing IOR though the onset and magnitude differ. None of the participants shows evidence of early facilitation for pre-cue or perceptual merging during the post-cue time range.

Conclusion

- MRTs obtained in the experiment with a continuous design and gamma distribution exhibit robust IOR at late CTOAs but no evidence of early facilitation or perceptual merging (Krüger et al., 2014) and are consistent with the results of MacInnes & Krüger (2015) and MacInnes (in press).
- These data are in line with other results showing early IOR but no facilitation under specific conditions. Danzinger & Kingstone (1999) found no facilitation when the spatial cued location was less likely. Maruff et al. (1999) observed no facilitation when there was a temporal gap between the cue offset and the target onset or a limited target duration. Taylor et al. (2015) did not see an early facilitation component in the lack of placeholders. Nevertheless, neither of these three manipulations could be our case.
- The lack of facilitation and the early IOR observed in our experiment could be a result of attentional control settings that allocate minimal attention to a cue seen as uninformative and a speedy withdraw of attention from that location (see Klein, 2000).

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